

or will be, but Suisse's is now the only one which works regularly at the Lyons railway terminus, in conjunction with a few of Lontin's regulators and with Lontin's generator. The results of the illumination are quite satisfactory, eighteen lamps being fed at an expense of 36 kilogrammes of charcoal per hour during fifteen hours every day, and with an expense of 9 francs per hour, including three francs of royalty for the Lontin Company. When this extensive space was illuminated by gas, the expense at 19 centimes per cubic metre was 6 francs per hour, and would have been nine francs if the gas were charged 30 centimes, or the full price. The economy for the Company results from the immense augmentation of the light distributed. They were enabled to diminish by 70 per cent. the number of hands engaged in night work, and the risks from fire are reduced to nothing. Lontin's system will be tried within a few days, in competition with improved gas, on the platform of the passengers department.

At the exhibition of the Palais de l'Industrie, Lontin's machine is working regularly every day from two to the closing hour, which varied according to the hour of sunset. No accident has been recorded. Siemens's machine has been very seldom at work, owing to several circumstances which prevented the public from making a direct comparison. The engineer of M. Siemens's factory having been selected as one of the jurymen, Siemens's machine was *ipso facto* out of competition; consequently we will not risk giving any definite opinion at present, confining ourselves to known facts. We visited Siemens's light at the works established by the universal firm at Passy, and we were very much satisfied with the effect which we witnessed. The illuminating power and regularity were out of question.

All the work of the Jablochhoff candle is done with Gramme machines, which have been fitted with a current inverter.

Lontin, Suisse, and other regulators are worked with continuous currents, which is considered as more advantageous.

Three different magneto-electric generators are before the public: Gramme, Lontin, and Siemens, based on similar principles, having a strong similarity in many respects, each of them claiming priority. We cannot presume to give a definite opinion on their special value, or on the value of their respective claims. The question can only be settled by the city or the Government deciding for the illumination of some part of the city or of some large public buildings.

We can state, at all events, that the Meritens Company, has started new machines, which we witnessed working with regularity at the Continental Hotel on the occasion of a great ball; that the Alliance machine, although excellent for lighthouses, has proved too heavy, too expensive, and too cumbrous for ordinary purposes. The Lontin machine is rotated at a rate of 200 or 250 turns per minute, and its rival from 700 to 800, which is a decided advantage in its favour.

It is not our province to adjust the claims relating to the manner of exciting almost any number of currents with a single generator and an electro-magnetic divider. But all the visitors to the Palais de l'Industrie have been astonished by the regularity of the Lontin light and its facility of combining the several arcs.

The other day the Ouest Railway Company established in the terminus of La Rue Saint Lazare three rival lights: Lontin, Parisian Company's improved lights, and Jablochhoff candles.

We decline to give a definite opinion of the respective merits of the Lontin and Jablochhoff systems before the moment when the numerous measures officially taken with a new photometer and the expenses in coals, electric carbon, and oil will be made public; but we can say that gas-light seems to be one-third dearer, and one-half only in general intensity.

Some of the great expectations raised when the Jablochhoff light was first exhibited have proved groundless. The shares of the gas companies have recovered from their depression, and reached at least their former value. But it cannot be said gas has conquered electricity, as electric lighting, with all its variety of origin and regulation, is gaining ground daily. Siemens's agents are at present fitting a large factory at Meaux with their regulators and generators. The works of installation of the Senate and Chamber of Deputies would have been impossible without the help of the electric light. A new influential daily paper, *Gil Blas*, has opened on the Boulevard de l'Opéra an "Halle aux Nouvelles," with no less than eight Jablochhoff candles. There is no part of Paris where electric lighting has not been exhibited, and its appearance is no longer a novelty, which is an all-important thing for its propagation.

In the meantime there are other inventors trying to generate electricity by new means. M. Beaudet has started a bichromate battery which he calls *unpolarisable*, perhaps without any real ground, but which, at all events, keeps in tolerable regulation for many days. M. Clamond has continued to produce a real electric light out of a series of thermal elements, which was considered as a mere impossibility a few months ago. We cannot say if the scheme of lighting by electricity out of a stove which warms an establishment, or a furnace which creates steam, is a Utopia, but we witnessed during some hours a light generated by the Clamond process, and a large workshop uses no other lighting process during the present winter.

The Municipal Council of Paris should open a public competition for lighting a large place or building, and invite all inventors of regulators and magneto-electric machines to place their apparatus in the hands of a competent commission, otherwise the question of electric lighting will remain in the dark for years, as it will be impossible for private individuals to decide which is the cheapest light produced and the best regulator.

W. DE FONVIELLE

NOTES

WE regret to have to announce the death of Mr. George Wharton Simpson, the editor of the *Photographic News*, which took place at Catford Bridge on the 15th inst. He was well known to the large circle of amateur and professional photographers as an able chemist, a lucid writer, and a careful experimenter. As one of the very earliest followers of photography, he was fully acquainted with all the many phases through which that technical science has passed, and we believe that very rarely, if ever, did he err in a matter of photographic history or technology. There existed between the readers of his journal and himself a feeling of almost personal friendship, as no question was too trivial to be answered in his notices to correspondents, and the answer given was always of a kindly and helpful nature. To Mr. Simpson we owe, amongst other things, the perfecting of the collodio-chloride process, a process which for delicacy and permanency is up till now unrivalled. Mr. Simpson was also an occasional contributor to various daily and other journals, and some of these articles we hope may be reprinted, since they are really succinct histories of progress in the art-science with which he was so greatly bound up. He will not easily be replaced in his editorial position, since there are few, if any, who have lived through the stirring times which have made photography what it is, and have followed it with the attention which he bestowed upon it. The large gathering of literary men and photographers at Abney Park Cemetery on Tuesday last evinced the high esteem in which he was held.

It is rumoured that Dr. William Ogle, Fellow of Corpus Christi, Oxford, and Examiner in Natural Science in the

University, has been appointed to succeed Dr. Farr in the Registrar-General's Office.

SIR JOSEPH FAYRER, K.C.S.I., has been appointed Examiner for the Medical Service of the Army in Anatomy and Physiology, *vice* George Busk, F.R.C.S., who has resigned the appointment.

THE first meeting of the Society of Telegraph Engineers will take place on Wednesday, the 28th inst., when Mr. Preece, the new president, will deliver his introductory address.

M. DUMAS, who is the Chancellor of the French Academy, pronounced the speech in answer to M. Taine, the new member. Everybody was struck by the spirited delivery and eloquence of the venerable perpetual secretary of the Academy of Sciences. The house was so full that even academicians were unable to find room on their benches.

MR. CROOKES has been exhibiting his wonderful experiments on radiant matter in Paris at the Ecole de Médecine, on Thursday, January 8, and on Saturday, the 11th; at the Observatory on Thursday, the 15th; and at the Société de Physique on Friday, the 16th. On all these occasions Mr. Crookes met with great success. M. Salle, a well-known physicist, spoke in the name of Mr. Crookes, who superintended the experiments. M. Gambetta and the Ministers of Public Works and of War were present at the Observatory, as well as the most influential members of the Institute.

THE *Times* Philadelphia Correspondent telegraphs on Sunday that the Edison electric lights in Menlo Park were still burning to the extent of about eighty lamps. Mr. Edison, finding that defective vacuums have developed in a considerable percentage of the lamps, has for several days been experimenting to improve the mechanical construction of the glass globe containing the light so as to insure a permanent vacuum. Mr. Edison's friends report that he is able to overcome the difficulty. Meanwhile, the manufacturing of additional lamps has been delayed, while no arrangements have yet been made practically to use the light in New York.

THE correspondent of the *New York Herald* has interviewed M. Dumas, M. Naudet Breguet, Mr. Crookes, and M. Fontaine, the president of the newly established Syndicat d'Électricité. The object of the interviews was to obtain the opinion of these gentlemen on the Edison light, and the results have been telegraphed to America. We can state that they are not against the possibility of the success of Mr. Edison.

WE notice an important communication which was made by Prof. Kessler at the annual meeting of the St. Petersburg Society of Naturalists on January 8, on the "Law of Mutual Help," as one of the chief agents in the development and progress of organisms. Prof. Kessler, although an able follower of Darwinism, thinks that the struggle for existence would be insufficient to explain the progress in organic life, if another law, that of sociability and of mutual help did not powerfully work for the improvement of the organisms and for strengthening the species. M. Severtsoff warmly supported this view, quoting several examples which prove that the unsociable birds are in a state of decay; so, for instance, although the system of robbing is ideally organised by the hawks, nevertheless the species is in a state of decay precisely because of its want of sociability.

ON January 10 the Russian Physical and Chemical Society held at St. Petersburg its annual meeting. After the reports of the secretaries Prof. Mendeleeff gave an interesting address on the resistance of fluids; he gave an historical sketch of the subject, and, pointing out how little it has hitherto been investigated, and how important it is, he invited Russian physicists to give special attention to that part of hydrodynamics. Prof. N.

Beketoff, from Kharkoff, read a paper on the dynamics of chemical reactions, and explained the electro-dynamical theory he proposes to explain them. Prof. Lentz made a communication on electrolysis, and M. Jablochkoff exhibited his new galvanic element.

M. LE BON, in rendering an account of the progress of his observations on the comparative mean weights of male and female skulls (*Bull.* of Paris Anthrop. Soc. t. v. fasc. 5) has explained the precautions which he had taken to avoid errors arising from considerations of the differences, bodily stature, age, race, and social or civilised status. After taking all these conditions into account, he finds a difference of 172 grammes in favour of the skulls of men over those of women. He asserts that while a newly-born girl has a heavier brain than a newly born boy—an advantage which she rapidly loses—the women of inferior races are relatively superior to those of highly civilised races, in other words, woman does not advance, and consequently, the differences between her and man are constantly augmenting. If M. le Bon's assertions are to be accepted as facts, they would undoubtedly seem to point to the necessity of bringing the opportunities of intellectual culture more closely within reach of women, but the learned doctor predicts that the abomination of desolation will fall on society if women be removed from the happy ignorance of their domestic hearths. Apart from his avowed preference for women with the cerebral capacities of savages, M. le Bon's memoir will be found of great use to the student of craniology, by helping him to determine the mathematical relations of different parts of the head, and their bearing on other parts of the body. We are glad to learn that the great value of his work in elucidating various obscure questions of general anthropology, have secured for it the award of the Godard prize for 1879.

AT Vienna a "Verein für Höhlenkunde" has been formed, with the object of investigating caves. Everybody taking an interest in this subject may become a member. The subscription is only 5 florins per annum. Dr. Franz von Hauer is the president, and Prof. Ferdinand von Hochstetter the vice-president of the new Society.

THE next German Anthropological Congress will be held at Berlin early in August next, and will be accompanied by an exhibition, illustrating prehistoric times in Germany. It will be closely followed by a Geological Congress to be held in the same city.

A MONUMENT of the late eminent naturalist and horticulturist, Freiherr von Siebold, will shortly be erected in his native town of Würzburg.

THE Japan papers record the fact that an enormous piece of coral was lately dredged up near Tosa. It is stated to have five branches, the stem being 15 inches in circumference and 5 feet in length.

THE Section of the Society of Arts formed in 1874 for the discussion of subjects connected with practical chemistry and its applications to the arts and manufactures, has been this year enlarged in its scope that it may include applications of physics as well as chemistry. At the six meetings of the present year the following papers will be read. The meetings are on Thursday evenings at eight o'clock, and the dates have been selected so that they do not clash with those on which the meetings of the Chemical Society are held:—January 22, "The Teaching of Technical Physics," by John Perry, late Professor of Engineering, Japan; February 12, "Gas Furnaces and Kilns for Burning Pottery," by Herbert Guthrie, C.E.; March 11, "The Noxious Gases Bill," by Dr. S. K. Muspratt, F.C.S.; April 8, "On Recent Improvements in Benzine Colours," by F. J. Friswell, F.C.S.; April 22, "On some Recent Advances in the Science

of Photography," by Capt. Abney, F.R.S.; May 13, "On some Physical Applications of Light," by Prof. W. G. Adams, F.R.S.

THE *Thunderer* gun experiments were continued at Woolwich last Friday, the object on that day being to test what is known as the "wedging" theory—the supposition that the tilting or displacement of the wad had to do with the bursting of the original gun. The experiments on Friday tended clearly to disprove this theory.

THE Public Works Department at Yedo have just published the *Reports of Progress* for 1878 and 1879 of the Geological Survey of Japan under Mr. B. S. Lyman.

THE Indian papers state that experiments are about to be made in Cyprus to test the possibility of cultivating mango seeds, as well as the seeds of other Indian fruits and vegetables.

EARTHQUAKES are reported (1) from Weisskirchen, where on December 22 at 5 A.M. a violent shock was felt; (2) from St. Blasien, in the Black Forest, where a shock was noticed on the same day at 10 P.M.; (3) from Idria (Carniola), where a subterranean explosion took place at 8.30 P.M., combined with a violent shaking of the ground and a cannon-like report. Several shocks were felt at Churwalden (Switzerland, canton of Chur) on January 7, between 2 and 4 A.M.; the last shock was accompanied with a noise like that of thunder, so that people were awake and dogs howled. In the Domochleg and at Savagnino only two shocks were felt, at 3h. 45m. and at 4h. 30m. The shocks had the direction from north to south.

AT Freiburg, in Breisgau, the beautiful and rare phenomenon of the *fata morgana* was observed at noon on December 16. While the sun was shining the fine pyramid of the Cathedral tower showed itself reflected above, of course with the point downwards. The reflecting stratum of air was almost at the level of the summit of the tower, thus producing a most peculiar effect.

WE are glad to see that the Epping Forest Field Club has been successfully formed, under the presidency of Mr. R. Meldola. From the tone which prevailed at the meeting of January 10, we should think the Club is likely to do good work. The original list of members is a pretty large one, and contains several well-known names.

THE continuation of frosty weather has produced unprecedented effects on the Lower Loire round Saumur. The bed of the river having an extent of about 1,000 yards, and the depth of water being very shallow, the Loire was entirely frozen and the flow of water towards the sea was almost entirely stopped. The consequence was that the level of the water was raised, and the walls protecting the low lands in danger of being submerged. It was necessary to employ dynamite to open a channel for the water. Unfortunately a part of the stream has found its way into the low lands. New ice is coming from the high lands, and the military have been ordered to work under the orders of civilian engineers.

AN ascent of Mount Hekla was made last summer by a lady, Miss Th. Petursson, daughter of the Bishop of Reykjavik, for the purpose of geological investigations. According to her observations the temperature at the bottom of the larger craters has of late risen considerably, while dense white columns of steam were rising from crevasses and holes which were hardly visible. The sulphurous odour of this steam was stronger than usual. The observations seem to indicate an approaching eruption of the volcano.

AN interesting archæological discovery has been made near Lehmke (in the district of Oldenstadt) consisting of some 1,200

mediæval metal plates, so-called *bractes*. Most of them bear the stamp of a lion in varying positions, others that of a figure with sword and standard, and a horizontal key below. The objects in question are now in the possession of the "Kreis-hauptmann" of Oldenstadt.

THE German Postmaster General, Herr Stephan, and Dr. Siemens, have succeeded in constituting an electro-technical society, which has for its objects the furtherance and development of the technical application of electricity, the progress of the knowledge of electricity by means of its technical appliances, and the establishment of a place of meeting for German technical electricians, whose scientific and commercial interests will, of course, be greatly benefited by such mutual intercourse.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus erythreus*) from India, presented by Mr. F. C. Grosvenor; two Bankiva Jungle Fowls (*Gallus bankiva*), two Starred Tortoises (*Testudo stellata*) from India, presented by Mr. W. Dunn, C.E., C.M.Z.S.; a Bar-tailed Godwit (*Limosa lapponica*), a Grey Plover (*Squatarola helvetica*), six Knots (*Tringa canutus*), thirteen Dunlins (*Tringa cinclus*), European, presented by Mr. F. Cresswell; three Chinchillas (*Chinchilla lanigera*) from South America, a Grey Struthidea (*Struthidea cinerea*) from Australia, a Red-throated Amazon (*Chrysotis collaria*) from Jamaica, purchased; two Fulmar Petrels (*Procellaria glacialis*), North European, deposited.

OUR ASTRONOMICAL COLUMN

THE ORION-TRAPEZIUM.—The following letter has been addressed to us by Prof. Holden, of the Naval Observatory, Washington:—

"IN NATURE, vol. xxi. p. 117, there is a note on a seventh star in the Orion-trapezium, which is 636 of G. P. Bond's Catalogue. It is there rated as mag. 13.3. Two other stars, 612 and 618 of Bond's catalogue are as near one of the larger stars as 636 is, and if it is intended to extend the nomenclature of seventh star, eighth star, &c., to these stars (which seems inadvisable), they should be included. Their positions from θ^1 Orionis are:—

Mag.	$\Delta \alpha$ (1857.0)				$\Delta \delta$ (1857.0)			
612	13.5	...	...	...	- 16.4	...	...	+ 24.6
618	13.1	...	...	...	- 10.4	...	...	+ 24.6

The magnitudes are too faint for Argelander's scale extended, but serve to compare with that of 636 viz. 13.3.

"As tests for large telescopes, quite a number of small stars discovered by Bond may be mentioned, whose positions are given in *Annals* of the Harvard College Observatory, vol. v. All of these really exist, as they have been repeatedly seen with the 26-inch refractor of this Observatory. They are Nos. 595 (13.9m.), 601 (15.6), 608 (14.3), 621 (15.6), 625 (15.6), 631 (14.3), 666 (13.9), 677 (14.8), 676 (13.1), 642 (15.6), 675 (15.2). The faintness of these stars (which are much better seen with a low power than with a high one) speaks well for the diligence of the late George Bond, whose search in this region was very thorough. Other small stars exist in the neighbourhood as follows:—

- "1. Rosse, No. 56, near G.P.B. No. 581.
- "2. A star, s.p., G.P.B. No. 724.
- "3. A double-star, n.f., G.P.B. No. 685.
- "(2 and 3 were discovered by Lassell.)
- "4. Three stars in or near the region bounded by the lines 641 to 663, 663 to 652, 652 to 641.
- "5. A star or mass of nebula which is not yet three years of age, has developed itself in the middle of the dark channel half way between 669 and 642. The star (?) itself is, roughly, equally distant from 669, 641, and 642.
- "There are no stars within the trapezium.
- "Cooper reports a star following G.P.B. 516 a few seconds. I cannot find it.
- "Any observations on these stars or on the celebrated variable 654 (frequently observed here) will be gladly received by me,